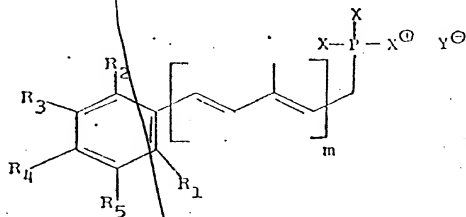


CLAIMS:

1. A compound of the formula:



wherein m is an integer from 0 to 1; R<sub>1</sub> and R<sub>2</sub> are lower alkyl; R<sub>3</sub> is hydrogen, halogen, lower alkyl, lower alkoxy, lower alkenyloxy, nitro, amino, lower alkylamino, lower alkanoylamino or N-heterocyclyl; R<sub>4</sub> is hydrogen, lower alkyl, lower alkenyl, lower alkoxy, lower alkenyloxy, nitro, amino, lower alkylamino, lower alkanoylamino or N-heterocyclyl; and R<sub>5</sub> is hydrogen, halogen, lower alkyl, lower alkenyl, lower alkoxy, lower alkenyloxy, nitro, amino, lower alkylamino, lower alkanoylamino or N-heterocyclyl; with the proviso that one of R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> is other than hydrogen and with the further proviso that when R<sub>3</sub> or R<sub>5</sub> is halogen, R<sub>4</sub> is other than a lower alkoxy; and X is aryl; and Y is an anion of an inorganic or organic acid.

1 3. The compound of claim 1 wherein  $R_1$ ,  $R_2$ ,  $R_3$ ,  $R_4$   
2 and  $R_5$  are hydrogen or lower alkyl.

1 4. The compound of claim 2 wherein said compound is  
2 2,3,6-trimethyl-benzyl-triphenylphosphonium bromide.

1 5. The compound of claim 2 wherein said compound is  
2 2,4,6-trimethyl-benzyl-triphenylphosphonium chloride.

1 6. The compound of claim 2 wherein said compound is  
2 2,3,4,6-tetramethyl-benzyl-triphenylphosphonium chloride.

1 7. The compound of claim 2 wherein said compound is  
2 pentamethyl-benzyl-trimethylphosphonium chloride.

1 8. The compound of claim 2 wherein said compound is  
2 2,4,6-triisopropyl-benzyl-triphenylphosphonium chloride.

1 9. The compound of claim 1 wherein at least one of  
2  $R_3$ ,  $R_4$  and  $R_5$  is lower alkoxy.

1 10. The compound of claim 8 wherein said compound is  
2 4-methoxy-2,6-dimethyl-benzyl-triphenylphosphonium chloride.

1 10. The compound of claim 8 wherein said compound is  
2 3-methoxy-2,4,6-trimethyl-benzyl-triphenylphosphonium chloride.

1 11. The compound of claim 8 wherein said compound is  
2 4-methoxy-2,3,5,6-tetramethyl-benzyl-triphenylphosphonium  
3 chloride.

1 12. The compound of claim 8 wherein said compound is  
2 3,6-dimethoxy-2,4,5-trimethyl-benzyl-triphenylphosphonium  
3 chloride.

1 13. The compound of claim 8 wherein said compound is  
2 4-methoxy-3-allyl-2,6-dimethyl-benzyl-triphenylphosphonium  
3 chloride.

1 14. The compound of claim 8 wherein said compound is  
2 4-methoxy-3-nitro-2,6-dimethyl-benzyl-triphenylphosphonium  
3 chloride.

1 15. The compound of claim 8 wherein said compound is  
2 5-(4-methoxy-2,3,6-trimethyl-phenyl)-3-methyl-penta-2,4-  
3 dien-1-triphenylphosphonium bromide.

1 ~~16.~~ The compound of claim 8 wherein said compound is  
2 4-ethoxy-2,3,6-trimethyl-benzyl-triphenylphosphonium chloride.

1 ~~17.~~ The compound of claim 8 wherein said compound is  
2 4-isopropoxy-2,3,6-trimethyl-benzyl-triphenylphosphonium  
3 chloride.

1 ~~18.~~ The compound of claim 1 wherein one of  $R_3$ ,  $R_4$  or  
2  $R_5$  is lower alkylamino.

1 ~~19.~~ The compound of claim 18 wherein said compound is  
2 3-dimethylamino-2,4,6-trimethyl-benzyl-triphenylphosphonium  
3 chloride.

1 ~~20.~~ The compound of claim 1 wherein one of  $R_3$  or  $R_5$   
2 is halogen.

1 ~~21.~~ The compound of claim 18 wherein said compound is  
2 3-chloro-2,4,6-trimethyl-benzyl-triphenylphosphonium chloride.

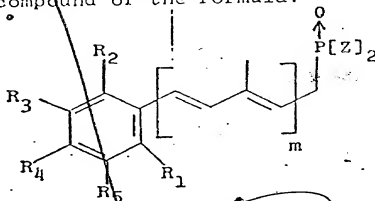
1 ~~22.~~ The compound of claim 1 wherein one of  $R_3$ ,  $R_4$   
2 or  $R_5$  is nitro.

1 ~~23.~~ The compound of claim 22 wherein said compound is  
2 3-nitro-2,4,6-trimethyl-benzyl-triphenylphosphonium chloride.

24. The compound of claim 1 wherein one of  $R_3$ ,  $R_4$  or  $R_5$  is lower alkenyloxy.

25. The compound of claim 24 wherein said compound is 5-(4-allyloxy-2,3,6-trimethyl-phenyl)-3-methyl-penta-2,4-dien-1-triphenylphosphonium bromide.

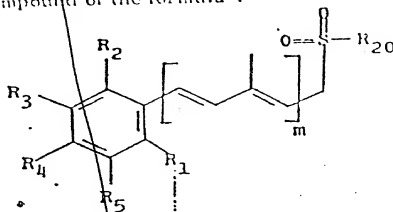
26. A compound of the formula:



wherein  $m$  is an integer from 0 to 1;  $R_1$  and  $R_2$  are a lower alkyl;  $R_3$  is hydrogen, halogen, lower alkyl, lower alkoxy, lower alkenyloxy, nitro, amino, lower alkylamino, lower alkanoylamino or N-heterocyclyl;  $R_4$  is hydrogen, lower alkyl, lower alkenyl, lower alkoxy, lower alkenyloxy, nitro, amino, lower alkylamino, lower alkanoylamino or N-heterocyclyl; and  $R_5$  is hydrogen, halogen, lower alkyl, lower alkenyl, lower alkoxy, lower alkenyloxy, nitro, amino, lower alkylamino, lower alkanoylamino or N-heterocyclyl; with the proviso that at least one of  $R_3$ ,  $R_4$  or  $R_5$  is other than hydrogen; and with the further proviso that when  $R_3$  or  $R_5$  is halogen,  $R_4$  is other than lower alkoxy, and  $Z$  is alkoxy.

27. The compound of claim 26 wherein said compound is 4-methoxy-2,3,6-trimethyl-benzyl-diethylphosphonate.

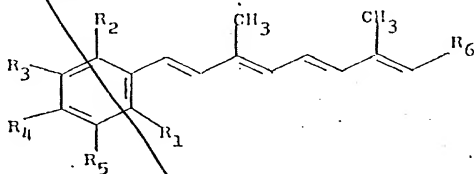
28. A compound of the formula :



wherein m is an integer from 0 to 1; R<sub>1</sub> and R<sub>2</sub> are lower alkyl; R<sub>3</sub> is hydrogen, halogen, lower alkyl, lower alkoxy, lower alkenyloxy, nitro, amino, lower alkylamino, lower alkanoylamino or N-heterocyclyl; R<sub>4</sub> is hydrogen, lower alkyl, lower alkenyl, lower alkoxy, lower alkenyloxy, nitro, amino, lower alkylamino, lower alkanoylamino or N-heterocyclyl; and R<sub>5</sub> is hydrogen, halogen, lower alkyl, lower alkenyl, lower alkoxy, lower alkenyloxy, nitro, amino, lower alkylamino, lower alkanoylamino or N-heterocyclyl; with the proviso that at least one of R<sub>3</sub>, R<sub>4</sub> or R<sub>5</sub> is other than hydrogen; and with the further proviso that when R<sub>3</sub> or R<sub>5</sub> is halogen, R<sub>4</sub> is other than lower alkoxy;

and R<sub>2</sub> aryl or aralkenyl, aryl substituted with  
an electron donating or electron withdrawing group,  
or aralkenyl where the aryl moiety is substituted by an  
electron withdrawing or electron donating group.

29. The compound of claim 28 wherein said compound is  
1-(phenylsulphonyl)-methyl-4-methoxy-2,3,6-trimethyl-benzene.



wherein R<sub>1</sub> and R<sub>2</sub> are lower alkyl; R<sub>3</sub> is hydrogen, lower alkyl, lower alkoxy, lower alkenyloxy, nitro, halo, amino, lower alkylamino, lower alkanoylamino, or N-heterocyclyl; R<sub>4</sub> is hydrogen, lower alkyl, lower alkenyl, lower alkoxy, lower alkenyloxy, nitro, lower alkanoyloxy, amino, lower alkylamino or N-heterocyclyl; R<sub>5</sub> is hydrogen, lower alkyl, lower alkenyl, lower alkoxy, lower alkenyloxy, nitro, halo, amino, lower alkanoylamino, lower alkylamino or N-heterocyclyl; with the proviso that at least one of R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> is other than hydrogen; with the further proviso that when R<sub>3</sub> or R<sub>4</sub> is halogen, R<sub>4</sub> is other than alkoxy; R<sub>6</sub> is formyl, hydroxymethylene, alkoxymethylene, alkanoyloxymethylene, carboxyl, alkoxycarbonyl, alkenyloxycarbonyl, alkynyloxycarbonyl, carbamoyl, mono (lower alkyl)-carbamoyl, di (lower alkyl)-carbamoyl, or N-heterocyclylcarbamoyl; and pharmaceutically acceptable salts thereof.



1 ~~31. The compound of claim 30 wherein  $R_3$ ,  $R_4$  and  $R_5$  are~~  
2 hydrogen or lower alkyl and  $R_6$  is carboxyl.

1 ~~32. The compound of claim 31 wherein said compound is~~  
2 9-(2,3,6-trimethyl-phenyl)-3,7-dimethyl-nona-2,4,6,8-tetraen-1-oic acid.

1 ~~33. The compound of claim 31 wherein said compound is~~  
2 9-(2,4,6-trimethyl-phenyl)-3,7-dimethyl-nona-2,4,6,8-tetraen-1-oic acid.

1 ~~34. The compound of claim 31 wherein said compound is~~  
2 9-(2,4,6-triisopropyl-phenyl)-3,7-dimethyl-nona-2,4,6,8-tetraen-1-oic acid.

1 ~~35. The compound of claim 31 wherein said compound is~~  
2 9-(2,3,4,6-tetramethyl-phenyl)-3,7-dimethyl-nona-2,4,6,8-tetraen-1-oic acid.

1 ~~36. The compound of claim 31 wherein said compound is~~  
2 9-(pentamethyl-phenyl)-3,7-dimethyl-nona-2,4,6,8-tetraen-1-oic acid.

1 ~~37. The compound of claim 30 wherein at least one of  $R_3$ ,  $R_4$~~   
2 ~~or  $R_5$  is lower alkoxy and  $R_6$  is carboxyl.~~

1 76. The compound of claim 37 wherein said compound is  
2 9-(4-methoxy-2,6-dimethyl-phenyl)-3,7-dimethyl-nona-2,4,6,8-  
3 tetraen-1-oic acid. *a*

1 77. The compound of claim 37 wherein said compound is  
2 9-(4-methoxy-2,3,6-trimethyl-phenyl)-3,7-dimethyl-nona-2,4,6,8-  
3 tetraen-1-oic acid.

B 1 36. The compound of claim 30 wherein  $R_6$  is alkoxycarbonyl.

1 44. The compound of claim 38 wherein said compound is  
2 9-(4-methoxy-2,3,6-trimethyl-phenyl)-3,7-dimethyl-nona-2,4,6,8-  
3 tetraen-1-oic acid methyl ester.

1 52. The compound of claim 38 wherein said compound is  
2 9-(4-methoxy-2,3,6-trimethyl-phenyl)-3,7-dimethyl-nona-2,4,6,8-  
3 tetraen-1-oic acid ethyl ester.

1 63. The compound of claim 40 wherein said compound is  
2 9-(4-methoxy-2,3,6-trimethyl-phenyl)-3,7-dimethyl-nona-2-trans,4-  
3 cis,6-trans,8-trans-tetraen-1-oic acid ethyl ester.

1 ~~3~~ The compound of claim ~~3~~ wherein said compound is  
2 9-(4-methoxy-2,3,6-trimethyl-phenyl)-3,7-dimethyl-nona-2,4,6,8  
3 tetraen-1-oic acid isopropyl ester.

1 ~~8~~ The compound of claim ~~3~~ wherein said compound is  
2 9-(4-methoxy-2,3,6-trimethyl-phenyl)-3,7-dimethyl-nona-2,4,6,8  
3 tetraen-1-oic acid butyl ester.

1 ~~9~~ The compound of claim ~~3~~ of the alkoxy carbonyl moiety  
2 substituted with alkylamino, morpholino, piperidyl, pyridyl, alkyl  
3 substituted piperidyl or alkyl substituted pyridyl.

1 ~~10~~ The compound of claim ~~3~~ wherein said compound is  
2 9-(4-methoxy-2,3,6-trimethyl-phenyl)-3,7-dimethyl-nona-2,4,6,8  
3 tetraen-1-oic acid diethyl aminoethyl ester.

1 ~~11~~ The compound of claim ~~3~~ wherein said compound is  
2 9-(4-methoxy-2,3,6-trimethyl-phenyl)-3,7-dimethyl-nona-2,4,6,8  
3 tetraen-1-oic acid (3-pyridyl)methyl ester.

(91)

13. The compound of claim 12 wherein  $R_6$  is alkynyloxy carbonyl.

14. The compound of claim 13 wherein said compound is  
9-(4-methoxy-2,3,6-trimethyl-phenyl)-3,7-dimethyl-nona-2,4,6,8-  
tetraen-1-oic acid allyl ester.

15. The compound of claim 14 wherein  $R_6$  is alkynyloxy carbonyl.

16. The compound of claim 15 wherein said compound is  
9-(4-methoxy-2,3,6-trimethyl-phenyl)-3,7-dimethyl-nona-2,4,6,8-  
tetraen-1-oic acid propargyl ester.

17. The compound of claim 16 wherein  $R_6$  is alkanoyloxymethylene.

18. The compound of claim 17 wherein said compound is  
1-acetoxy-9-(4-methoxy-2,3,6-trimethyl-phenyl)-3,7-dimethyl-nona-  
2,4,6,8-tetraene.

19. The compound of claim 18 wherein  $R_6$  is carbamoyl.

20. The compound of claim 19 wherein said compound is  
9-(4-methoxy-2,3,6-trimethyl-phenyl)-3,7-dimethyl-nona-2,4,6,8-  
tetraen-1-oic acid amide.

(98)

1/4 more or less

B 1

20. The compound of claim 19 wherein  $R_6$  is lower alkylcarbamoyl.

1

21. The compound of claim 20 wherein said compound is

2

9-(4-methoxy-2,3,6-trimethyl-phenyl)-3,7-dimethyl-nona-2,4,6,8-

3

tetraen-1-oic acid ethyl amide.

1

22. The compound of claim 20 wherein said compound is

2

9-(4-methoxy-2,3,5,6-tetramethyl-phenyl)-3,7-dimethyl-nona-2,4,6,8-

3

tetraen-1-oic acid ethyl amide.

1

23. The compound of claim 21 wherein said compound is

2

9-(4-methoxy-2,3,6-trimethyl-phenyl)-3,7-dimethyl-nona-2,4,6,8-

3

tetraen-1-oic acid diethylamide.

B 1

24. The compound of claim 20 wherein  $R_6$  is N-heterocyclylcarbonyl.

1

25. The compound of claim 21 wherein said compound is

2

9-(4-methoxy-2,3,6-trimethyl-phenyl)-3,7-dimethyl-nona-2,4,6,8-

3

tetraen-1-oic acid morpholide.

B 1

26. The compound of claim 20 wherein ~~at least one of  $R_4$  and  $R_5$~~

B 2

~~is lower alkenyl and  $R_6$  is carbonyl.~~

(99)

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65. The compound of claim 63 wherein said compound is  
9-(4-methoxy-3-allyl-2,6-dimethyl-phenyl)-3,7-dimethyl-nona-  
2,4,6,8-tetraen-1-oic acid.

66. The compound of claim 60 wherein at least one of  $R_3$  and  $R_4$  is nitro and  $R_6$  is ~~carbonyl or~~ alkoxycarbonyl.

67. The compound of claim 65 wherein said compound is  
9-(4-methoxy-3-nitro-2,6-dimethyl-phenyl)-3,7-dimethyl-nona-2,4,6,8-  
tetraen-1-oic acid ethyl ester.

68. The compound of claim 65 wherein said compound is  
9-(3-nitro-2,4,6-trimethyl-phenyl)-3,7-dimethyl-nona-2,4,6,8-  
tetraen-1-oic acid.

69. The compound of claim 65 wherein at least one of  $R_3$  and  $R_4$  is lower alkylamino and  $R_6$  is alkoxycarbonyl.

70. The compound of claim 68 wherein said compound  
is 9-(3-dimethylamino-2,4,6-trimethyl-phenyl)-3,7-dimethyl-nona-  
2,4,6,8-tetraen-1-oic acid ethyl ester.

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40. The compound of claim 30 wherein at least one of  $R_3$  or  $R_5$  is halogen and  $R_6$  is carboxyl.

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71. The compound of claim 70 wherein said compound is 9-(3-chloro-2,4,6-trimethyl-phenyl)-3,7-dimethyl-nona-2,4,6,8-tetraen-1-oic acid.

1B  
2B  
72. The compound of claim 30 wherein at least one of  $R_3$ ,  $R_4$  or  $R_5$  is lower alkenyloxy and  $R_6$  is carboxyl.

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73. The compound of claim 72 wherein said compound is 9-(4-allyloxy-2,3,6-trimethyl-phenyl)-3,7-dimethyl-nona-2,4,6,8-tetraen-1-oic acid.

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